

CLAIMS

What is claimed is:

1. A method for Digital Subscriber Line (DSL) handshaking, the method comprises:
 - 5 transmitting, by a remote DSL transceiver, first signals containing even numbered carriers for a predetermined period of time to initiate the DSL handshaking to produce R-ETONES-REQ;
 - detecting, by a central office DSL transceiver, the R-ETONES-REQ to produce detected
10 R-ETONES-REQ;
 - determining, by the central office DSL transceiver, alignment of a hyperframe in accordance with a Time Compression Multiplexing – Integrated Service Digital Network (TCM-ISDN) Timing Reference (TTR);
15 transmitting, by the central office DSL transceiver, first response signals containing odd numbered carriers in accordance with the alignment of the hyperframe to produce C-TONES-TTR;
 - 20 acquiring, by the remote DSL transceiver, TTR synchronization in accordance with the C-TONES-TTR;
 - upon acquiring TTR synchronization, transmitting, by the remote DSL transceiver, second signals containing even numbered carriers to produce R-TONE-TTR;
25 in response to the R-TONE-TTR, transmitting, by the central office DSL transceiver, second response signals containing odd numbered carriers to produce C-GALF1-TTR;
 - in response to the C-GALF1-TTR, transmitting, by the remote DSL transceiver, third
30 signals containing even numbered carriers to produce R-FLAG1-TTR; and

in response to the R-FLAG1-TTR, transmitting, by the central office DSL transceiver, third response signals containing odd numbered carriers to produce C-FLAG1.

2. The method of claim 1, wherein the first signals comprises even numbered carriers eight through thirty less, carriers twelve and fourteen, and includes periodic phase reversal.

3. The method of claim 1 further comprises:
subsequent to transmitting the first signals, transmitting, by the remote DSL transceiver, additional first signals from one or more signaling families to produce R-TONES-REQ.

4. The method of claim 1, wherein the first response signals comprises odd numbered carriers five through thirty-one, less carriers seven and nine, and including periodic phase reversal.

5. The method of claim 1, wherein the acquiring, by the remote DSL transceiver, TTR synchronization further comprises:
continue transmitting, by the remote DSL transceiver, the R-ETONES-REQ until the TTR synchronization is acquired.

6. The method of claim 1, wherein the second signals comprises even numbered carriers eight through thirty, less carriers twelve and fourteen.

7. The method of claim 1, wherein the second response signals comprises odd numbered carriers five through thirty-one, less carriers seven and nine.

8. A method for remote Digital Subscriber Line (DSL) transceiver to initiate a DSL handshake, the method comprises:

transmitting first signals containing even numbered carriers for a predetermined period of
5 time to initiate the DSL handshaking to produce R-ETONES-REQ;

receiving first response signals containing odd numbered carriers in accordance with the alignment of a hyperframe to produce C-TONES-TTR;

10 acquiring TTR synchronization in accordance with the C-TONES-TTR;

upon acquiring TTR synchronization, transmitting second signals containing even numbered carriers to produce R-TONE-TTR;

15 receiving second response signals containing odd numbered carriers to produce C-GALF1-TTR; and

in response to the C-GALF1-TTR, transmitting third signals containing even numbered carriers to produce R-FLAG1-TTR.

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9. The method of claim 8, wherein the first signals comprises even numbered carriers eight through thirty less, carriers twelve and fourteen, and includes periodic phase reversal.

25 10. The method of claim 8 further comprises:

subsequent to transmitting the first signals, transmitting additional first signals from one or more signaling families to produce R-TONES-REQ.

30 11. The method of claim 8, wherein the acquiring TTR synchronization further comprises:

continue transmitting the R-ETONES-REQ until the TTR synchronization is acquired.

12. The method of claim 8, wherein the second signals comprises even numbered
5 carriers eight through thirty, less carriers twelve and fourteen.

13. A method for central office Digital Subscriber Line (DSL) transceiver to participate in a DSL handshake, the method comprises:

receiving first signals containing even numbered carriers for a predetermined period of
5 time to initiate the DSL handshaking to produce R-ETONES-REQ;

detecting the R-ETONES-REQ to produce detected R-ETONES-REQ;

determining alignment of a hyperframe in accordance with a Time Compression
10 Multiplexing – Integrated Service Digital Network (TCM-ISDN) Timing Reference (TTR);

transmitting first response signals containing odd numbered carriers in accordance with
the alignment of the hyperframe to produce C-TONES-TTR;

15 receiving second signals containing even numbered carriers to produce R-TONE-TTR;

in response to the R-TONE-TTR, transmitting second response signals containing odd
numbered carriers to produce C-GALF1-TTR;

20 receiving third signals containing even numbered carriers to produce R-FLAG1-TTR;
and

in response to the R-FLAG1-TTR, transmitting third response signals containing odd
25 numbered carriers to produce C-FLAG1.

14. The method of claim 13, wherein the first signals comprises even numbered
carriers eight through thirty less, carriers twelve and fourteen, and includes periodic
phase reversal.

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15. The method of claim 13, wherein the first response signals comprises odd numbered carriers five through thirty-one, less carriers seven and nine, and including periodic phase reversal.
- 5 16. The method of claim 13, wherein the second signals comprises even numbered carriers eight through thirty, less carriers twelve and fourteen.
17. The method of claim 13, wherein the second response signals comprises odd numbered carriers five through thirty-one, less carriers seven and nine.

18. A remote Digital Subscriber Line (DSL) transceiver capable of initiating a DSL handshake, the remote DSL transceiver comprises:

processing module; and

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memory operably coupled to the processing module, wherein the memory stores operational instructions that cause the processing module to:

10 transmit first signals containing even numbered carriers for a predetermined period of time to initiate the DSL handshaking to produce R-ETONES-REQ;

receive first response signals containing odd numbered carriers in accordance with the alignment of a hyperframe to produce C-TONES-TTR;

15 acquire TTR synchronization in accordance with the C-TONES-TTR;

upon acquiring TTR synchronization, transmit second signals containing even numbered carriers to produce R-TONE-TTR;

20 receive second response signals containing odd numbered carriers to produce C-GALF1-TTR; and

in response to the C-GALF1-TTR, transmit third signals containing even numbered carriers to produce R-FLAG1-TTR.

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19. The remote DSL transceiver of claim 18, wherein the first signals comprises even numbered carriers eight through thirty less, carriers twelve and fourteen, and includes periodic phase reversal.

30 20. The remote DSL transceiver of claim 18, wherein the memory further comprises operational instructions that cause the processing module to:

subsequent to transmitting the first signals, transmit additional first signals from one or more signaling families to produce R-TONES-REQ.

- 5 21. The remote DSL transceiver of claim 18, wherein the memory further comprises operational instructions that cause the processing module to acquire the TTR synchronization by:

continue transmitting the R-ETONES-REQ until the TTR synchronization is acquired.

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22. The remote DSL transceiver of claim 18, wherein the second signals comprises even numbered carriers eight through thirty, less carriers twelve and fourteen.

23. A central office Digital Subscriber Line (DSL) transceiver capable of initiating a DSL handshake, the central office DSL transceiver comprises:

processing module; and

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memory operably coupled to the processing module, wherein the memory stores operational instructions that cause the processing module to:

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receive first signals containing even numbered carriers for a predetermined period of time to initiate the DSL handshaking to produce R-ETONES-REQ;

detect the R-ETONES-REQ to produce detected R-ETONES-REQ;

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determine alignment of a hyperframe in accordance with a Time Compression Multiplexing – Integrated Service Digital Network (TCM-ISDN) Timing Reference (TTR);

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transmit first response signals containing odd numbered carriers in accordance with the alignment of the hyperframe to produce C-TONES-TTR;

receive second signals containing even numbered carriers to produce R-TONE-TTR;

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in response to the R-TONE-TTR, transmit second response signals containing odd numbered carriers to produce C-GALF1-TTR;

receive third signals containing even numbered carriers to produce R-FLAG1-TTR; and

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in response to the R-FLAG1-TTR, transmit third response signals containing odd numbered carriers to produce C-FLAG1.

24. The central office DSL transceiver of claim 23, wherein the first signals comprises even numbered carriers eight through thirty less, carriers twelve and fourteen, and includes periodic phase reversal.

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25. The central office DSL transceiver of claim 23, wherein the first response signals comprises odd numbered carriers five through thirty-one, less carriers seven and nine, and including periodic phase reversal.

10 26. The central office DSL transceiver of claim 23, wherein the second signals comprises even numbered carriers eight through thirty, less carriers twelve and fourteen.

27. The central office DSL transceiver of claim 23, wherein the second response signals comprises odd numbered carriers five through thirty-one, less carriers seven and
15 nine.